DERWENT-ACC-NO: 1989-266188

DERWENT-WEEK: 198937

TITLE: Liquid fuel burner with ignition and fuel-air supply control has auxiliary igniting switch controlling electromagnetic valve on auxiliary pipe with flame strengthening switch on main pipe

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PRIORITY-DATA: 1988GB-004000 (February 20, 1988)

PATENT-FAMILY:

PUB-NO	PUB-DATE	LANGUAGE
GB 2215032 A	September 13, 1989	EN

APPLICATION-DATA:

PUB-NO	APPL-DESCRIPTOR	APPL-NO	APPL-DATE
GB 2215032A	N/A	1988GB-004000	February 20, 1988

INT-CL-CURRENT:

TYPE	IPC DATE
CIPS	F23D11/38 20060101
CIPS	F23D11/42 20060101

CIPS F23Q3/00 20060101

ABSTRACTED-PUB-NO: GB 2215032 A

BASIC-ABSTRACT:

The burner has a main injector (56) which mixes fuel and air to produce a main flame (94) and an auxiliary injector (43) which produces an auxiliary flame (93). The auxiliary is positioned so that it can ignite the fuel/air mixture from the main injector. The auxiliary flame is itself ignited by sparking electrodes carried on a support (11). Manual controls (81 to 84) are used to regulate ignition and fuel/air supplies.

A switch seat has an indicating light with an igniting switch controlling ignition of the electrodes. An auxiliary flame igniting switch controlling an electro-magnetic valve on the auxiliary flame pipe and a flame strengthening switch for controlling the electro-magnetic valves on the main flame pipe and main flame air pipe.

ADVANTAGE - Fuel wastage is minimised.

CHOSEN-DRAWING: Dwg.2/6

TITLE-TERMS: LIQUID FUEL BURNER IGNITION AIR SUPPLY CONTROL AUXILIARY IGNITE SWITCH ELECTROMAGNET VALVE PIPE FLAME STRENGTH MAIN

DERWENT-CLASS: Q73 X27

EPI-CODES: X27-G02;

(12) UK Patent Application (19) GB (11) 2 215 032 (13) A

(43) Date of A publication 13.09.1989

(21) Application No 8804000.1

(22) Date of filing 20.02.1988

(51) INT CL⁴
F23Q 9/00, F23D 11/24

(52) UK CL (Edition J)
F4T THB TS2E TS2F TS2H2 TS2H4 TS6E1 TS6E3 TS6E6

(56) Documents cited
None

(58) Field of search
UK CL (Edition J) F4T
INT CL⁴ F23D, F23Q

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(54) Liquid fuel burner

(57) A liquid-fuel burner has a main injector 56 which mixes fuel and air to produce a main flame 94, an auxiliary injector 43 which produces an auxiliary flame 93, the auxiliary flame being positioned so that it can ignite the fuel/air mixture from the main injector. The auxiliary flame is itself ignited by sparking electrodes carried on a support 11. Manual controls 81 to 84 are used to regulate ignition and fuel/air supplies.

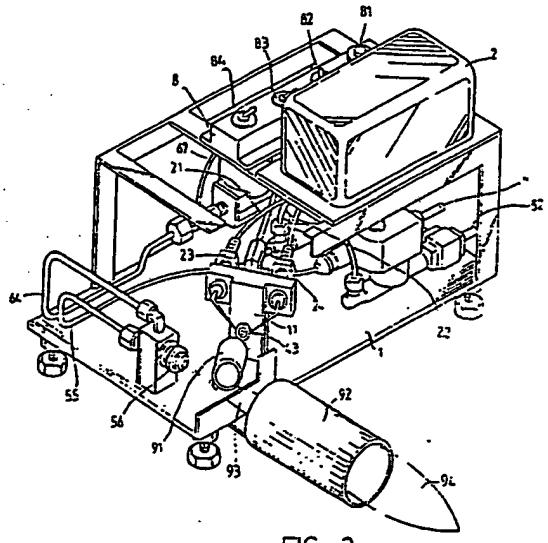

FIG. 2

GB 2 215 032 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

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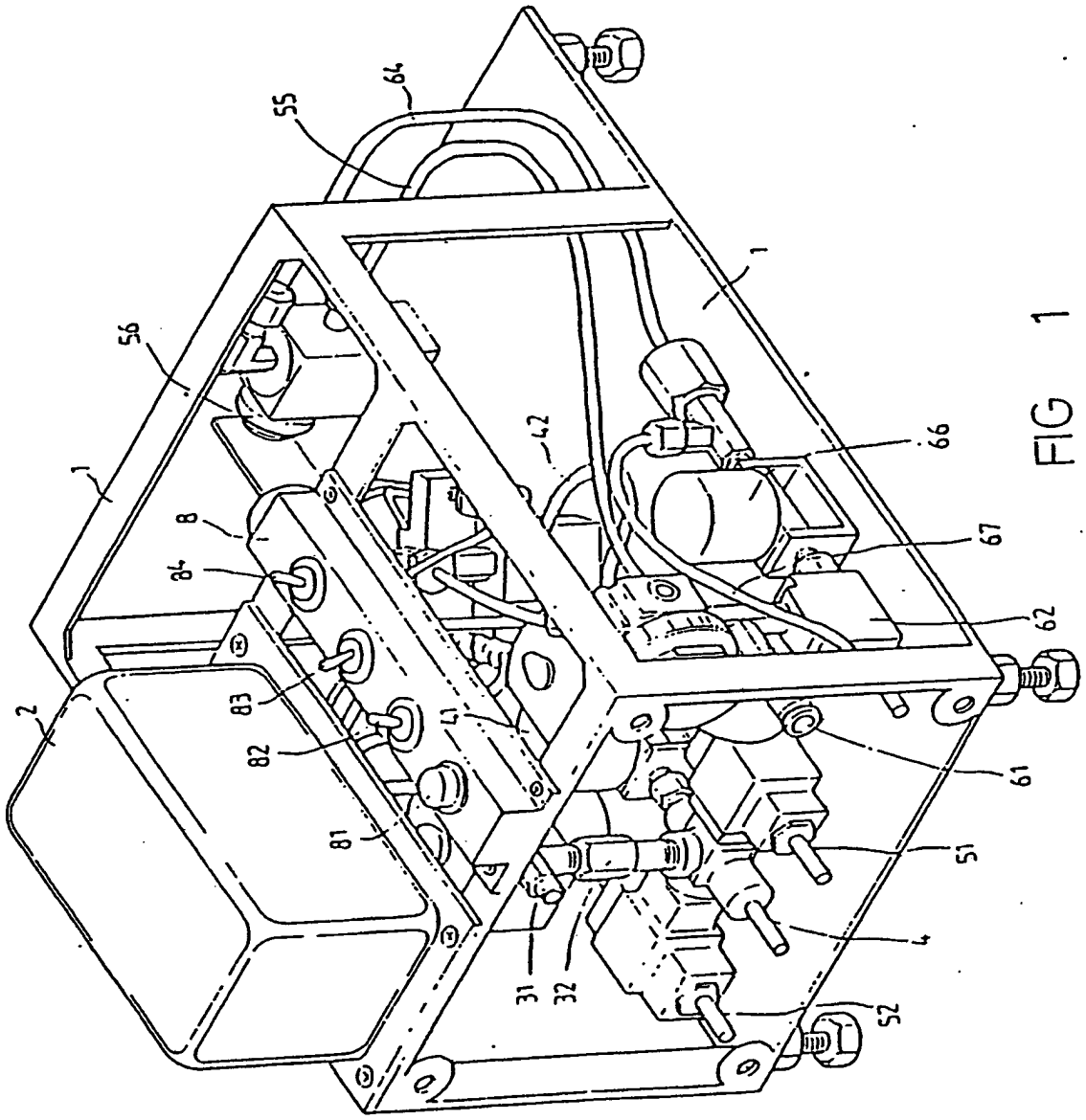

FIG 1

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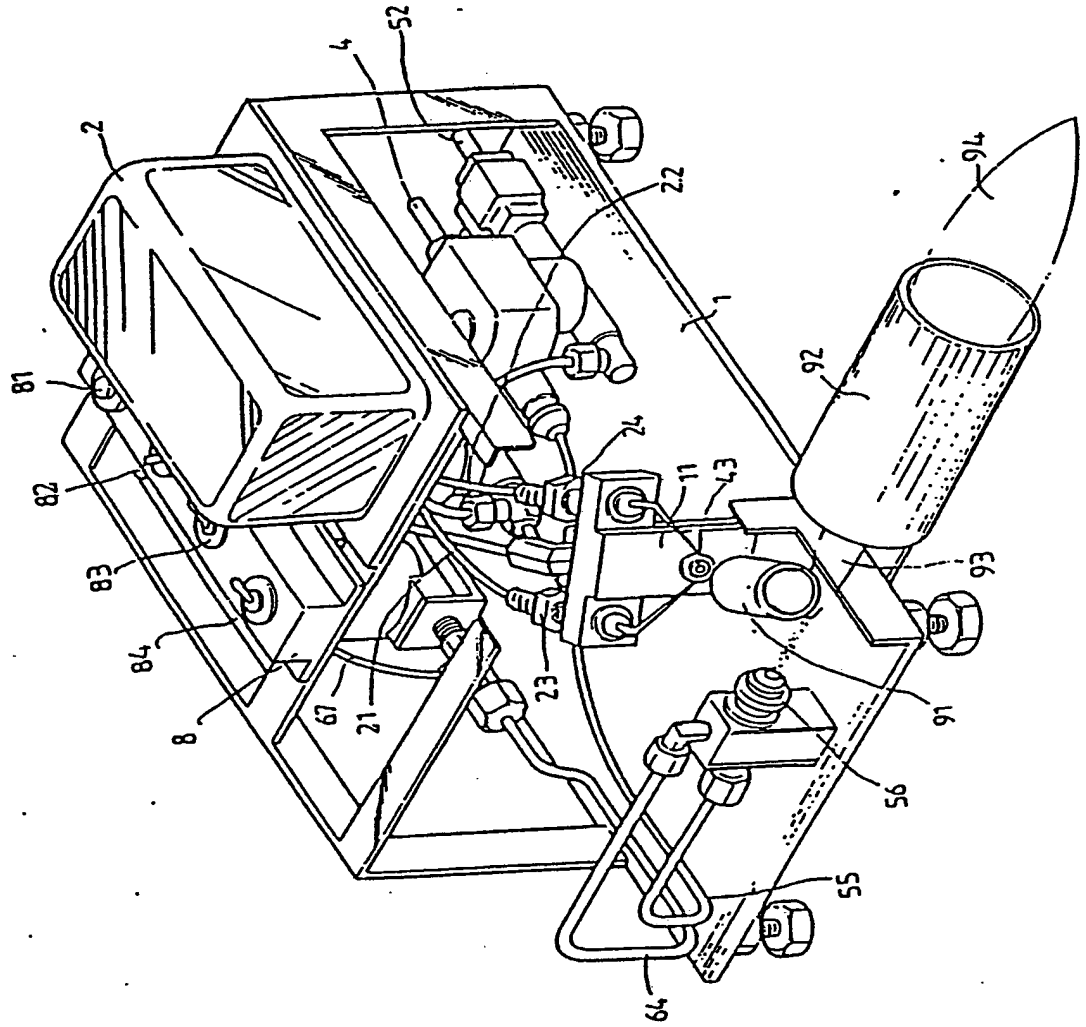

FIG. 2

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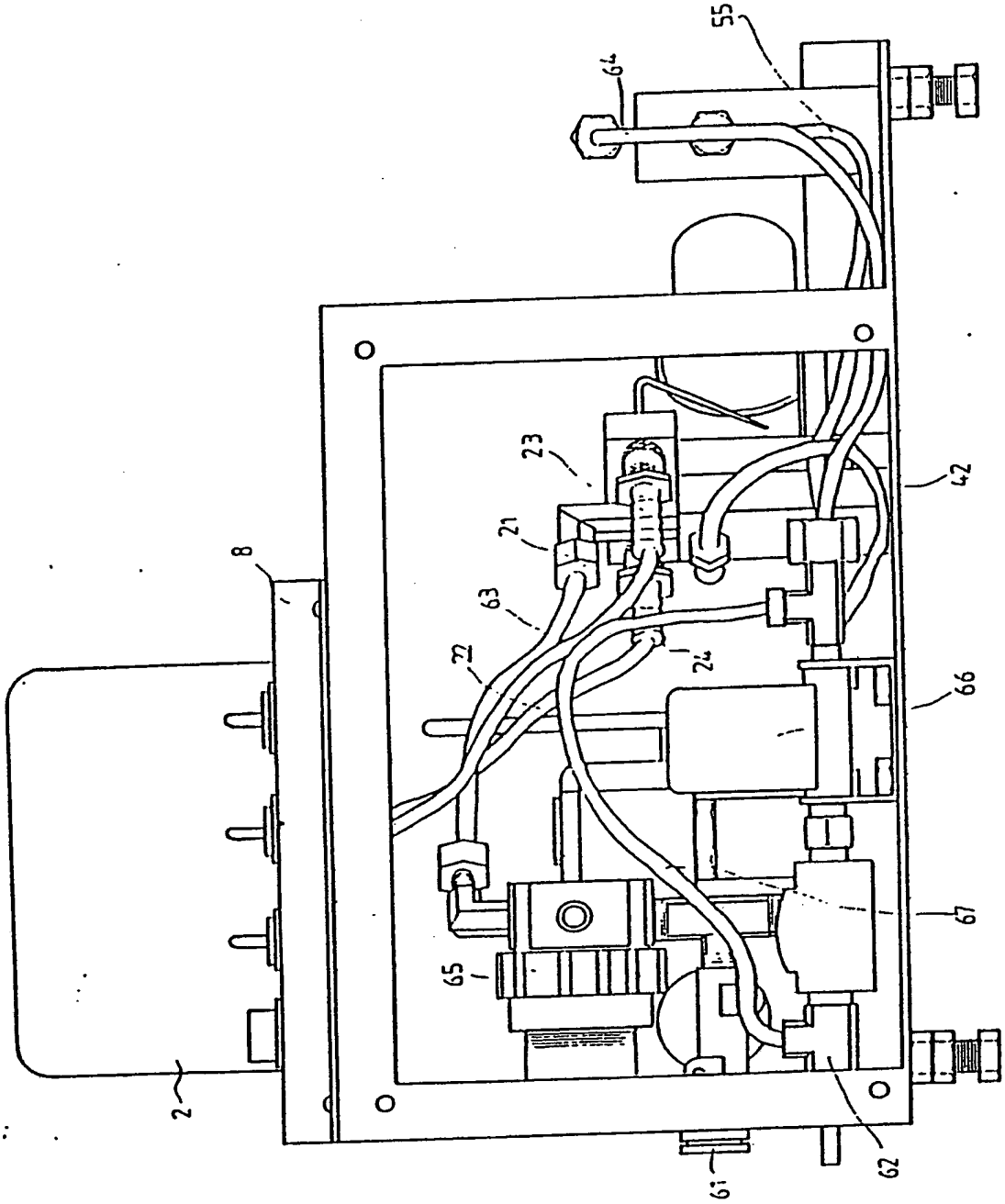

FIG 3

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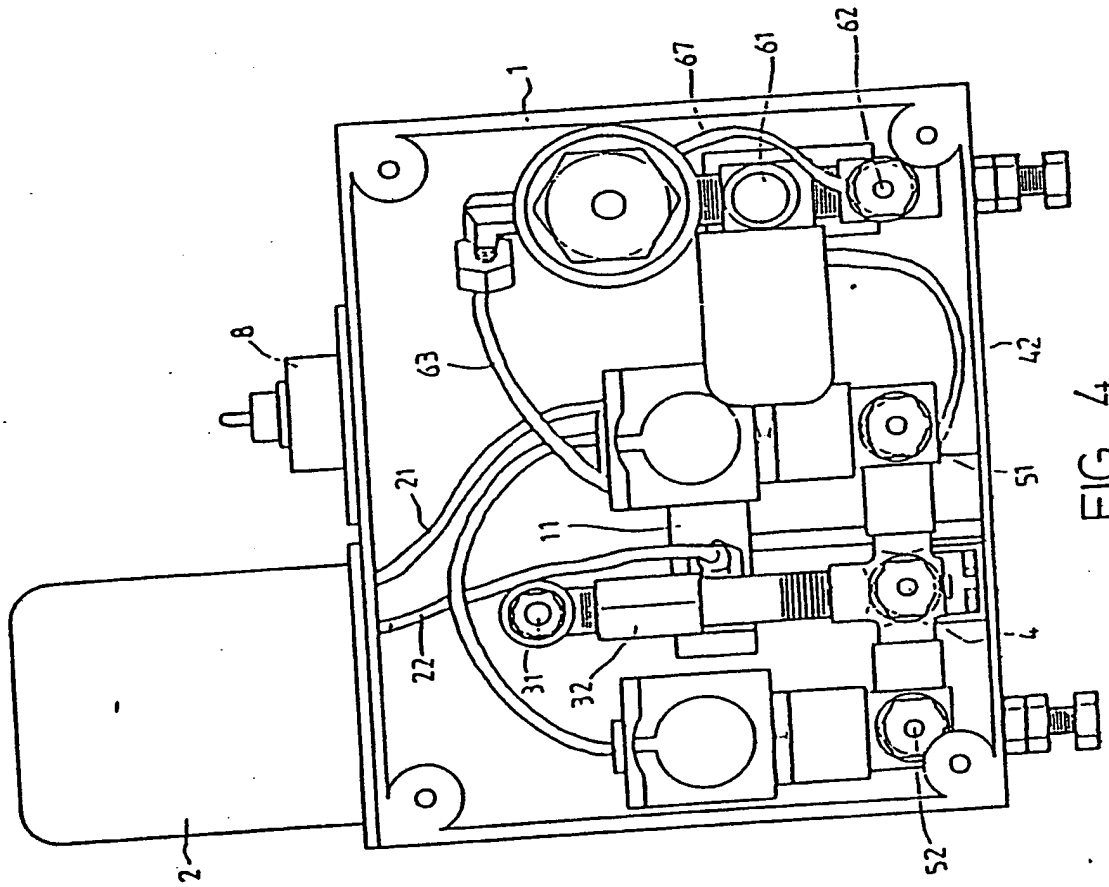

FIG. 4

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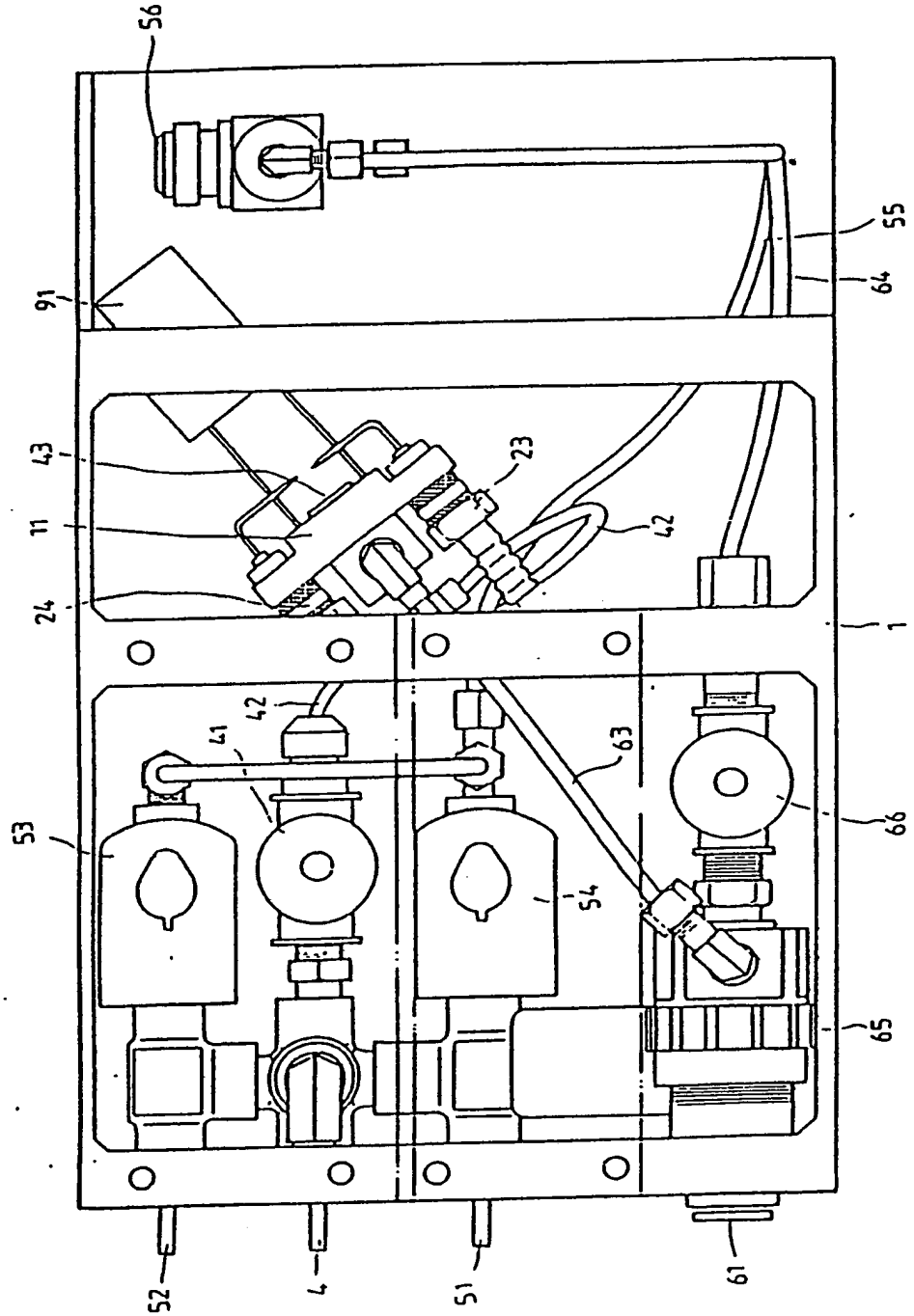

FIG 5

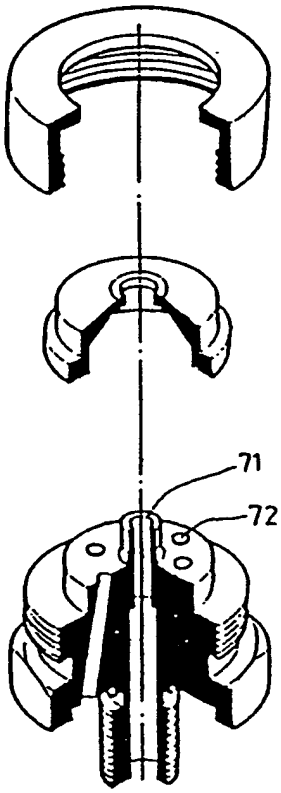

FIG . 6

TITLE: PREHEATING-EXEMPT FUEL GASIFYING STOVE

This invention relates to a preheating-exempt fuel gasifying stove, or burner.

It is found that most fuels for gasifying stoves are kerosene and Diesel fuel oil which are of high igniting point. Hence, in order to cause the fuel to be burned easily, it is commonly suggested to set a preheating procedure so that the fuel will be heated prior to its gasification thereby helping the combustion of the fuel. However, the temperature increased in such preheating procedure is often insufficient to cause a complete combustion, thus wasting fuel, lowering the efficiency as well as polluting the ~~circumstances~~ environment. Furthermore, the gasifying stove is usually connected externally with a tank of gas for igniting the gasifying fuel. Whereas, the gas tank will occupy a lot of space, causing much inconvenience in installation.

It is, therefore, an object of the present invention to provide a preheating-exempt fuel gasifying stove which may obviate and mitigate the above-mentioned drawbacks.

It is the primary object of the present invention to provide a preheating-exempt fuel gasifying stove which untilizes a high voltage coil to connect with an electrode rod to produce sparks so as to ignite an auxiliary flame which will in turn ignite a main flame.

It is another object of the present invention to provide a preheating-exempt fuel gasifying stove wherein the fuel is entrained with highly compressed air to pass through a micro-injector to gasify momentarily so that the gasified fuel can be ignited directly without preheating.

It is still another object of the present invention to provide a preheating-exempt fuel gasifying stove in which the fuel can be transmitted even without applying pressure thereto but if a high pressure is applied thereto, a faster gasifying effect and a higher efficiency will be obtained.

It is still another object of the present invention to provide a preheating-exempt fuel gasifying stove which makes use of a guiding cylinder to lead the first flame produced in the intersection of the auxiliary flame

and the main flame to form the second combustion hence providing a complete combustion and a higher temperature for combustion.

It is a further object of the present invention to provide a preheating-exempt fuel gasifying stove which is economic to produce.

Other objects and advantages of the invention will be apparent from the following description and the accompanying drawings in which similar characters of reference indicate similar parts throughout the several views.

FIG. 1 is a perspective view of a preheating-exempt fuel gasifying stove according to the present inventions;

FIG. 2 is a perspective view of the present invention from another view;

FIG. 3 is front view of FIG. 1;

FIG. 4 is a left side elevational view of FIG. 1;

FIG. 5 is a top plan view of FIG. 1; and

FIG. 6 is an exploded view of the micro injector.

With reference to the drawings and in particular to FIG. 1 thereof, the preheating-exempt fuel gasifying stove

according to the present invention mainly comprises a frame 1 on the top of which there is a high voltage coil 2 connected with the ends of two wires 21 and 22. The other ends of the wires 21 and 22 are connected to electrode rods 23 and 24 which are mounted on a stand 11 vertically disposed on the frame 1. From the front ends of the electrode rods 23 and 24 extend a pair of symmetric igniting members having an intersection just in front of an auxiliary injector 43.

Fuel is fed through an opening 31 below which there is a filter 32 which is in turn connected at the lower end with three throttling valves 4, 51 and 52 which are in communication with one another. The auxiliary throttling valve 4 is connected at the right side with respect to FIG. 1 with an electro-magnetic valve 41 which is in turn joined to the auxiliary injector 43 via a pipe 42. Two primary throttling valves 51 and 52 are respectively disposed at two sides of the auxiliary throttling valve 4 wherein the primary throttling valve 51 is used at the beginning of the main flame while the primary throttling valve 52 is for strengthening the main flame. Two

electro-magnetic valves 53 and 54 are respectively connected to the throttling valves 52 and 51 so as to control the operation thereof. Similarly, the electro-magnetic valves 53 and 54 are connected to the main flame injector 56 via a pipe 56.

Air is transmitted through an inlet 61 below which there is an air valve 62 so as to control the air flow rate. At the right side of the main valve 62 there are two pipes 63 and 64. The pipe 63 is connected at the upper end with a voltage stabilizing device 65 which is in turn connected to the auxiliary flame injector 43. The pipe 64 is connected at the right side with an electro-magnetic valve 66 and extends to the main flame injector 56. An exhaust pipe 67 is used to let the low-pressurized air to feed directly into the main flame injector 56 without passing through the electro-magnetic valve 66 (see FIG. 3).

FIG. 6 shows the structure of the injectors 43 and 56 of the present invention. As may be seen, the center hole 71 of the structure is a fuel injecting opening around which are a plurality of small holes

72 for injecting high pressure air. The auxiliary flame pipe 42 and the main flame pipe 5 are respectively led into center holes 71 of corresponding injectors 43 and 56. The air pipes 63 and 64 are also respectively passed into the small holes 72 of corresponding injectors 43 and 56. Thus, when the fuel is injected out of the center hole 71, it will mix with the high pressure air therearound.

On the frame 1 there is a small guiding cylinder 91 mounted on the outlet of the auxiliary flame injector 43. Besides, a large guiding cylinder 92 is disposed outside the outlet of the main flame injecor 56 and the front end of the small guiding cylinder 91 is adjusted to intersect with the central region of the main flame injector 56 and the large guiding cylinder 92.

Referring back to FIG. 1, the frame 1 is further provided at the top with a seat 8 on which there are an indicating light 81, an igniting switch 82 for controlling the ignition of the electrode rods 23 and 24, an auxiliary flame igniting switch 83 for controlling the electro-magnetic valve 41 on the auxiliary flame pipe

and the voltage stabilizing device 65 of the air pipe, and a flame strengthening switch 84 for controlling the electro-magnetic valves 53 and 54 of the main flame pipe and the electro-magnetic valve 66 and the air pipe so as to obtain the strong main flame.

When in use, first turn on the igniting switch 82 and adjust the air volume valve for the auxiliary flame until the electrode rods 23 and 24 produce sparks. Then, turn on the auxiliary igniting switch 83 and regulate the auxiliary flame fuel valve 4 to inject the fuel from the center hole 71 of the auxiliary flame injector 43. The fuel will thus mix with the high pressure air to gasify momentarily and will be ignited to form an auxiliary flame 93. Thereafter, adjust the air volume valve to an appropriate position and open the first peroid main flame fuel valve 51 so as to open the electro-magnetic valve 53 of the main flame pipe and the electro-magnetic valve 66 of the air pipe thereby injecting fuel and air out of the main flame injector 56 and gasifying the fuel momentarily. Meanwhile, since the auxiliary flame is at a continous igniting condition, the gasified

fuel injected out of the main flame injector 56 will be rapidly ignited to form the first combustion at the intersection. The flame will be led out of the guiding cylinder 92 to form the second combustion. As a result, the effeciency and the temperature for combustion will be increased but the waste gas pollution will be decreased. Further, the operator may selectively open the flame strengthening valve 84 and in the meantime, the electro-magnetic valves 53 and 54 will be opened to offer a large amount of fuel which will be adapted to a provision of appropriate air supply so as to provide a strong flame.

The present invention is applicable to ~~kerpn~~ etc sene, Diesel fuel oil and heavy fuel oil. The combustion temperature may reach 1370 C in an open stove test and 1700 C in a closed stove test while the carbon monoxide concentration is mererly 64--100ppm. It is estimated that the evolved heat for kerosene is around 10390 Kcal/kg which is much better than the commonly used stove.

~~The various features of novelty which charaterize the invention are pointed out with particularity in the~~

CLAIMS

1. A liquid-fuel burner comprising a main fuel injector having means to mix air with injected fuel to produce a main burner flame, and including an auxiliary fuel injector having means to mix air under pressure with injected fuel to produce an auxiliary flame, sparking means for igniting the fuel/air mixture from the auxiliary injector to produce said auxiliary flame, said auxiliary injector being located so that the air/fuel mixture from the main injector is ignited by said auxiliary flame.

2. A preheating-exempt fuel gasifying stove comprising a high voltage coil on a frame and connected with two electrodes via two wires, said electrode being rigidly mounted on a fixed seat vertically disposed on the frame and having at the front end an igniting rod, said inginting rods being at symmetric positions and intersecting just in front of an auxiliary flame injector; a fuel inlet below which there is a filter which is in turn connected at the lower end with a three-way oil valve, said three-way oil valve being connected with an electro-magnetic valve at each way thereof, one way of the oil valve being connected to an auxiliary flame injector while the other two way thereof being directed to a main flame injector; an air inlet having at the lower part an air volume valve and extending to form two pipes one of which is connected at the upper end to a voltage stabilizing device and then led to the auxiliary flame injector while the other one is connected to an electro-magnetic valve and extends to the main flame injector, an exhaust pipe being provided

to enable low pressurized air to feed to the main auxiliary flame injector without passing through the elelctro-magnetic valve; a small guiding cylinder and a large guiding cylinder respectively located outside the auxiliary flame injector and the main flame injector and the small guiding cylinder being adjusted to cause the front end thereof intersecting the central region of the main flame injector and the large guiding cylinder; and a switch seat having thereon an indicating light, an igniting switch for controlling ignition of the electrodes, an auxiliary flame igniting switch for controlling the electro-magnetic valve on the auxiliary flame pipe and a flame strengthening switch for controlling the electro-magnetic valves on the main flame pipe and main flame air pipe.

3. A preheating-exempt fuel gasifying injector as claimed in claim 2, wherein the center holes of the main flame injector are used for injecting fuel while the small holes therearound for injecting air so that when the fuel is injected out of the center holes, the fuel will be mixed with the air entrained therewith so as to be able to gasify momentarily.

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